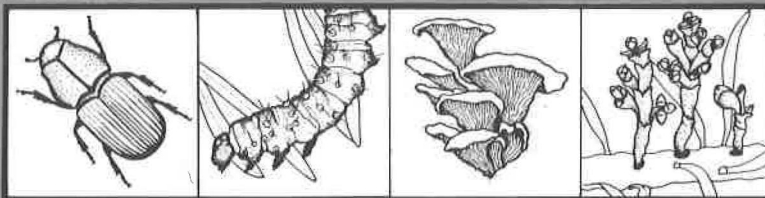


Forest Pest Management



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Tip Moth Control at the Lenore Tree Improvement Area 1993

by

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INTRODUCTION

The Lenore Tree Improvement Area, Clearwater National Forest, was established in 1990 to test growth characteristics of improved stock from throughout the region. It is located on a south-facing bench along the Clearwater River, approximately 15 miles west of Orofino, Idaho. It currently contains 13,000 ponderosa pine trees planted in March of 1991 as 1-year-old stock. The pine trees cover 3.5 acres and are about 2-3 feet tall. Damage to the terminal and lateral shoots was first noticed in the summer of 1991. The damage was typical of that caused by tip moths (*Rhyacionia* sp.). However, pheromone traps failed to capture any moths during late spring of 1992 and damage continued. On June 8, 1992, an estimated 10 percent of the trees were damaged. The plantation is an early selection growth trial for ponderosa pine where insects and diseases affecting growth need to be controlled. Plans were made to determine the species of tip moth causing the damage and to manage them, using direct control in the spring of 1993.

METHODS

The spring of 1992 was warm and dry, allowing insect populations to mature and emerge early. Pheromone traps, placed March 20, 1992, were thought to have been too late to capture the flight of the tip moths. The weather during spring of 1993 was more normal. We placed traps with four different bait formulations on March 9, 1993. Three replications of the traps were placed 20 meters apart. Moths were found in the traps with pheromone bait E9-12AC:E9-12OH (97:3) the following day. Chris Niwa, PNW Station, Corvallis, Oregon, determined the moths were *Rhyacionia zozana*.

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The plantation was sprayed with carbaryl at a rate of 2 pounds active ingredient per acre on March 17-25 in between periods of rainy weather. A second application was made on April 6-8. Application was made with a back pack sprayer aimed primarily on the terminals with some coverage on the laterals. Cost of the spray treatment was:

Carbaryl	\$ 30
Labor (7 person days)	<u>\$1,050</u>
Total	\$1,080

Because of the high value of the plantation trees and the lack of other seedlings in the area, the entire plantation was treated and no trees were available as controls. Therefore, to determine the effectiveness of the spray treatment, we compared 1992 damage (pre-spray estimate) to 1993 damage (post-spray estimate).

A sample of 1,623 trees (about a 12 percent sample) was examined for terminal and lateral damage before spraying, and again in July 1993, when new damage was evident. This included three trees from each family multiplied by three replications per family, for a total of nine trees per family.

RESULTS

Eighty-two moths were caught from March 10 through April 21 (Figure 1).

In 1992, there were 111, or 7 percent, of the terminals and 162 laterals infested. Since more than one lateral per tree could be infested, and we did not count total laterals per tree, we cannot calculate percent of laterals infested. In 1993, only 24 terminals (1.5 percent) and 148 laterals were infested. The infested terminals and laterals by family for 1992 (pre-spray) and 1993 (post-spray) are shown in Table 1. Of the 181 families, 24 had no damage to terminals or laterals in 1992 or 1993 on the nine trees examined per family. Eighty-five families had no terminal damage either year, while 11 families had terminal damage both years.

Because the main concern was the effect of insects on terminal growth, the spray treatment was considered successful with reduction in terminal infestation. Numbers of infested laterals declined only slightly and could be due to incomplete coverage during spraying.

Tip Moth Trap Catches Lenore TIA 1993

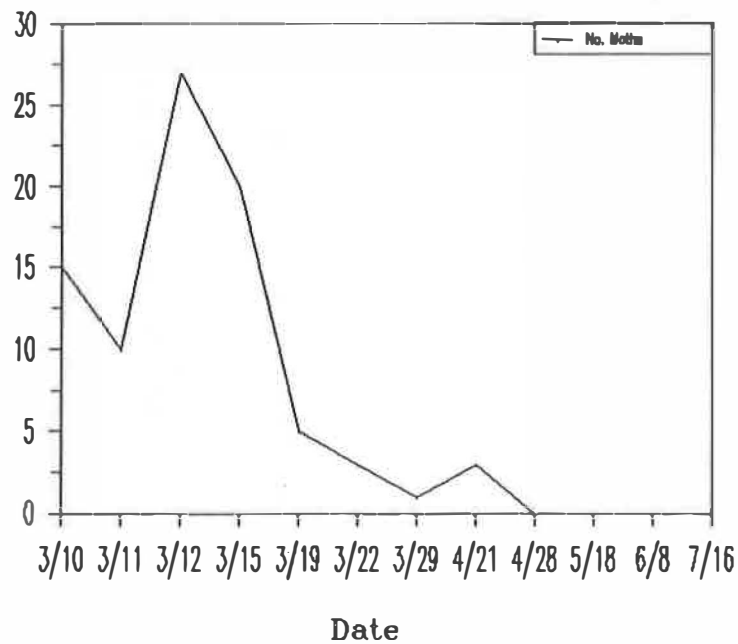


Figure 1--Number of tip moths caught in pheromone traps.

Table 1--Number of infested terminals and laterals by family by year.

* Families with no damage on nine trees examined.

Family	# Infested Terminals		# Infested Laterals	
	1992	1993	1992	1993
137	1	1	0	0
139	0	0	1	0
149	1	0	2	2
* 157	0	0	0	0
158	1	0	1	1
160	0	0	1	0
161	1	0	2	1
168	1	0	0	0
171	2	0	4	2
172	1	0	1	1
173	1	0	1	1
* 183	0	0	0	0
184	1	0	4	3
185	2	0	3	2
188	1	0	2	0
190	1	0	0	0
* 191	0	0	0	0
* 192	0	0	0	0
193	0	0	1	3
* 195	0	0	0	0
197	1	0	1	0
199	1	0	1	1
200	0	0	1	2
202	2	0	4	1
* 204	0	0	0	0
206	1	0	3	1
* 207	0	0	0	0
210	0	0	1	0
211	1	0	1	1
212	4	0	2	5
214	1	0	0	0
* 216	0	0	0	0
* 217	0	0	0	0
219	0	0	0	1
220	0	0	0	1
221	0	0	3	1
224	1	0	0	0
* 225	0	0	0	0
226	0	0	0	1
* 248	0	0	0	0
261	0	0	1	0
262	2	1	3	1
271	1	0	2	1
272	1	0	0	0
274	0	0	3	0
275	0	0	0	3

Family	# Infested Terminals		# Infested Laterals	
	1992	1993	1992	1993
303	1	0	0	2
304	0	0	2	1
305	1	1	2	3
310	0	0	1	0
* 315	0	0	0	0
* 316	0	0	0	0
318	1	0	0	0
321	0	0	1	2
322	1	0	3	0
325	1	0	2	0
331	1	0	0	0
333	1	1	4	1
334	2	0	1	0
* 335	0	0	0	0
338	1	0	3	2
339	0	0	1	1
340	0	1	0	0
341	0	0	3	1
342	1	1	2	0
343	1	0	0	1
345	2	0	0	0
346	1	0	0	0
348	1	0	1	2
349	0	1	0	1
357	2	0	1	0
359	0	0	0	2
366	0	0	0	2
368	1	0	1	1
369	0	0	0	1
372	0	0	1	0
373	0	0	0	1
376	0	0	0	1
377	0	1	0	2
378	0	0	1	0
379	1	0	0	0
* 380	0	0	0	0
* 381	0	0	0	0
382	0	1	0	0
396	1	0	0	0
405	0	0	1	1
407	3	0	0	0
410	1	0	2	0
411	1	1	0	2
412	0	0	1	0
417	1	0	5	0
* 418	0	0	0	0
419	1	0	0	3
420	0	0	1	0

Family	# Infested Terminals		# Infested Laterals	
	1992	1999	1992	1999
431	0	0	1	2
432	2	0	2	2
434	3	2	1	1
438	1	1	0	3
441	3	0	1	0
502	1	0	2	1
503	1	0	2	0
504	2	0	0	0
505	1	0	0	0
506	0	0	1	0
510	1	0	0	3
523	1	0	1	3
524	0	0	1	0
525	2	0	1	1
526	1	0	1	0
528	0	0	0	1
602	0	0	0	0
603	1	0	2	0
604	0	0	3	1
605	0	1	0	1
606	0	1	0	1
607	1	0	0	2
608	0	0	0	1
609	0	0	0	1
610	0	0	0	1
* 611	0	0	0	0
612	0	0	0	1
614	0	0	1	1
615	0	0	1	0
616	2	2	0	3
617	0	1	0	0
618	1	0	1	0
619	1	0	0	1
620	1	0	0	0
621	0	0	2	0
622	2	0	0	0
623	0	0	1	1
624	1	0	1	3
626	1	0	1	1
627	0	0	0	2
628	0	0	1	1
694	1	0	0	0
695	0	0	0	0
710	0	0	1	2
712	1	0	0	0
717	1	0	0	0
724	0	0	1	2
725	1	0	0	1

Family	# Infested Terminals		# Infested Laterals	
	1992	1993	1992	1993
726	1	0	0	2
727	1	0	0	1
728	0	0	0	1
730	1	0	2	0
* 732	0	0	0	0
* 751	0	0	0	0
752	0	0	3	1
753	0	0	3	1
754	1	1	1	0
755	1	0	0	1
756	0	1	0	1
757	0	0	2	1
758	0	0	0	1
759	0	0	1	0
760	0	1	0	0
761	1	0	1	3
762	0	0	2	0
763	3	2	2	1
764	0	0	1	0
765	0	0	1	1
* 766	0	0	0	0
767	2	0	2	1
* 768	0	0	0	0
769	3	0	5	4
770	0	0	1	0
771	2	1	3	3
772	0	0	0	3
773	0	0	0	2
774	0	0	2	2
775	0	0	1	2
776	0	0	1	0
777	1	0	0	0
778	0	0	3	0
779	0	0	0	0
780	1	0	4	2
782	1	0	0	1
* 796	0	0	0	0
* 797	0	0	0	0
798	0	0	2	0
Total trees	1,623	1,623	1,623	1,623
Total infested	111	24	162	148
% Infested	6.84	1.48		
Std Dev	0.2524	0.1207		

